

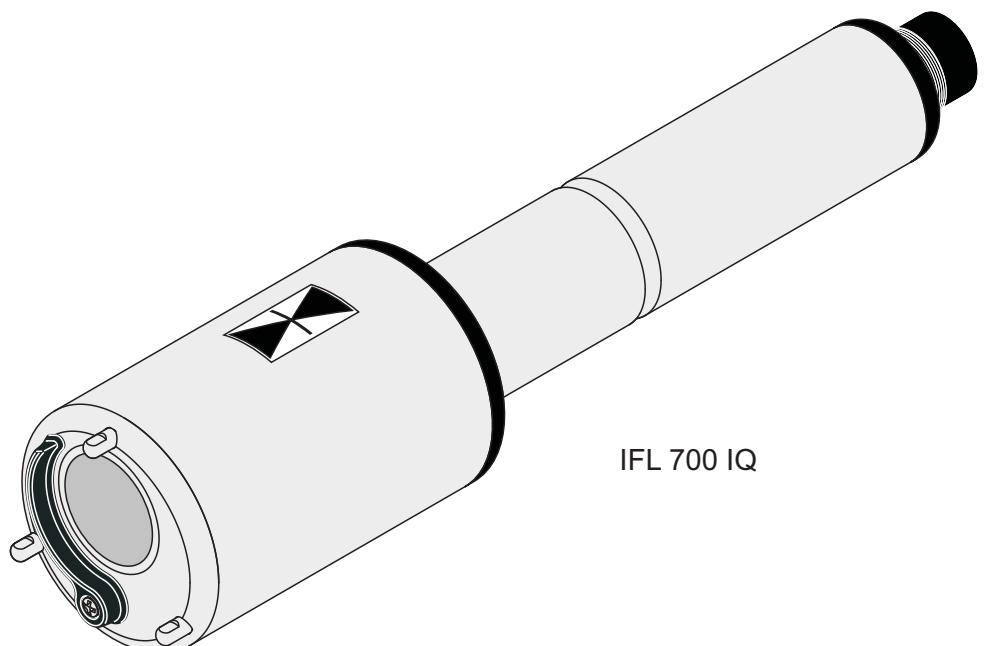


a **xylem** brand

**Operating manual**

# **IFL 700 IQ**

## **IFL 701 IQ**



**IQ SENSOR NET total suspended solids sensor**



**Note**

For the most recent version of the manual, please visit [www.ysi.com](http://www.ysi.com).

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# 1 Overview

## 1.1 How to use this component operating manual

### Structure of the IQ SENSOR NET operating manual

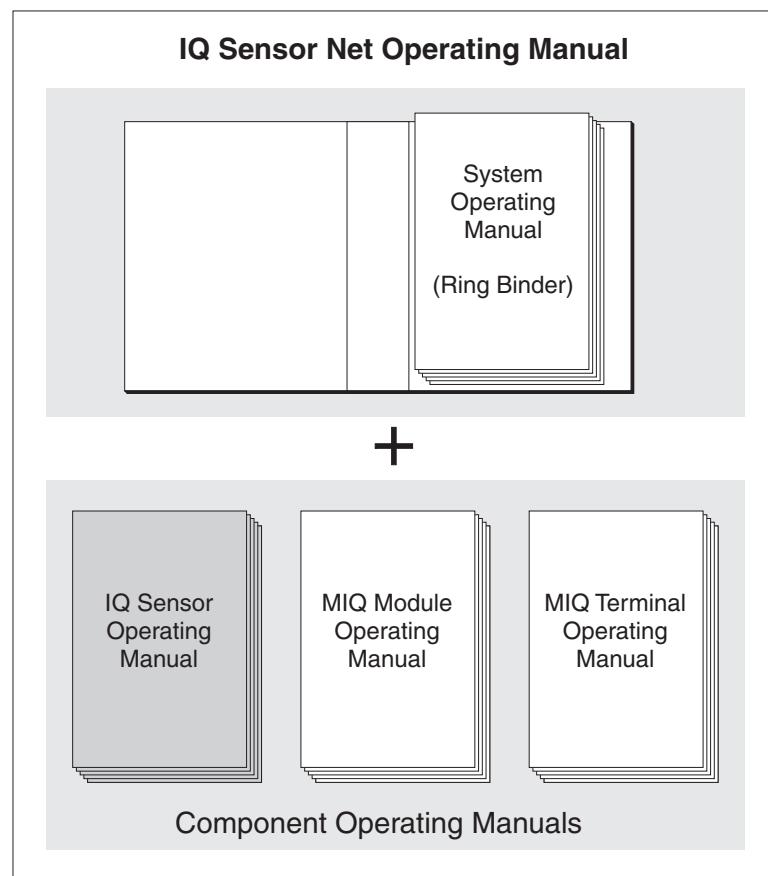


Fig. 1-1 Structure of the IQ SENSOR NET operating manual

The IQ SENSOR NET operating manual has a modular structure like the IQ SENSOR NET system itself. It consists of a system operating manual and the operating manuals of all the components used.

Please file this component operating manual into the ring binder of the system operating manual.

## 1.2 Structure of the IFL 70x IQ sludge level sensor

### Structure

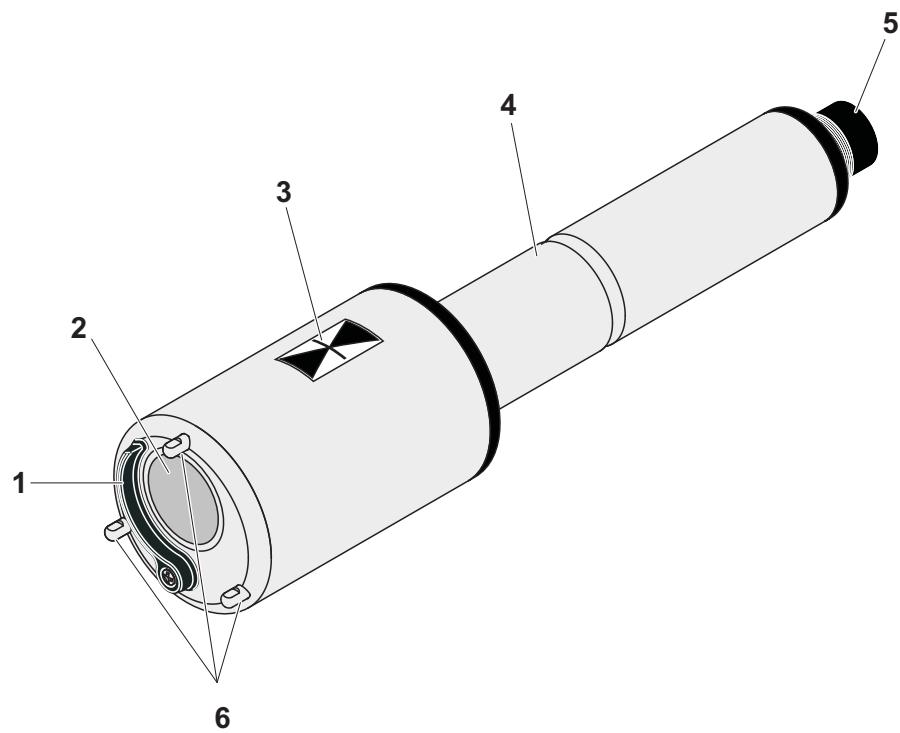


Fig. 1-2 Structure of the sludge level sensor (example: IFL 700 IQ)

1	Wiper (only IFL 700 IQ)
2	Ultrasonic transducer
3	Marking for immersion depth 0.1 m
4	Shaft
5	Plug head connector
6	Leg supports

### Measuring principle

The IFL 70x IQ is based on the ultrasonic measuring principle. Ultrasonic waves transmitted by the ultrasonic transducer are totally or partly reflected by layers at which the density of the measuring medium changes (e.g. sludge blanket, bottom of the basin), and then received again. Based on the reflection intervals, the distance between the levels and the ultrasonic transducer is determined:

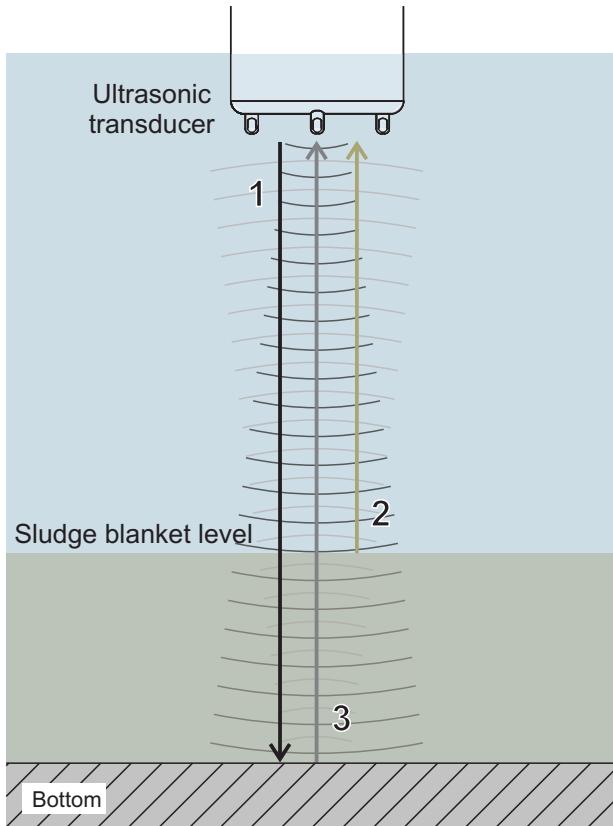


Fig. 1-3 Principle of the ultrasonic measurement

1	Transmitted ultrasonic waves
2	Echo reflected by the sludge blanket (short reflection interval)
3	Echo reflected by the bottom area (long reflection interval)

### Wiper (cleaning system)

The IFL 700 IQ sensor has a mechanical wiper that effectively cleans gas bubbles and dirt off the ultrasonic transducer. The wiper operates contactless and is maintenance-free and wear-free.

### 1.3 Recommended fields of application

Sludge level control and monitoring in waste water treatment.



Detailed information on the subject of sludge level measurement is given for example in the DWA information sheet no. 256 "Prozessmesstechnik auf Kläranlagen, Teil 8: Messeinrichtungen zur Bestimmung des Schlammspiegels" (Process measuring technique at wastewater treatment plants, part 8: Instrumentation for determination of the sludge level".



## 2 Safety instructions

### 2.1 Safety information

#### 2.1.1 Safety information in the operating manual

This operating manual provides important information on the safe operation of the product. Read this operating manual thoroughly and make yourself familiar with the product before putting it into operation or working with it. The operating manual must be kept in the vicinity of the meter so you can always find the information you need.

Important safety instructions are highlighted in this operating manual. They are indicated by the warning symbol (triangle) in the left column. The signal word (e.g. "CAUTION") indicates the danger level:



#### **WARNING**

**indicates a possibly dangerous situation that can lead to serious (irreversible) injury or death if the safety instruction is not followed.**



#### **CAUTION**

**indicates a possibly dangerous situation that can lead to slight (reversible) injury if the safety instruction is not followed.**

#### **NOTE**

*indicates a situation where goods might be damaged if the actions mentioned are not taken.*

#### 2.1.2 Safety signs on the product

Note all labels, information signs and safety symbols on the product. A warning symbol (triangle) without text refers to safety information in this operating manual.

#### 2.1.3 Further documents providing safety information

The following documents provide additional information, which you should observe for your safety when working with the measuring system:

- Operating manuals of other components of the IQ SENSOR NET system (power packs, controller, accessories)
- Safety datasheets of calibration and maintenance equipment (e.g. cleaning solutions).

## 2.2 Safe operation

### 2.2.1 Authorized use

The authorized use of the IFL 70x IQ consists of its use as a sludge level sensor in the IQ SENSOR NET. Only the operation and running of the product according to the instructions and technical specifications given in this operating manual is authorized (see chapter 7 TECHNICAL DATA). Any other use is considered unauthorized.

### 2.2.2 Requirements for safe operation

Note the following points for safe operation:

- The product may only be operated according to the authorized use specified above.
- The product may only be supplied with power by the energy sources mentioned in this operating manual.
- The product may only be operated under the environmental conditions mentioned in this operating manual.
- The product may not be opened.

### 2.2.3 Unauthorized use

The product must not be put into operation if:

- it is visibly damaged (e.g. after being transported)
- it was stored under adverse conditions for a lengthy period of time (storing conditions, see chapter 7 TECHNICAL DATA).

## 3 Commissioning

### 3.1 IQ SENSOR NET system requirements

#### Software statuses of the controller and terminal components

The operation of the IFL 70x IQ requires the following software versions in the IQ SENSOR NET:

- MIQ/MC2 Controller software: Version 3.35 or higher
- MIQ/TC 2020 XT Terminal software: Version 3.35 or higher

### 3.2 Scope of delivery

- Sludge level sensor IFL 700 IQ or IFL 701 IQ
- Operating manual

### 3.3 Installation

#### 3.3.1 General information

##### NOTE

*Sharp objects can damage the ultrasonic transducer. Please be careful, especially when handling sharp tools, when cleaning and during transport.*

##### NOTE (only IFL 700 IQ)

*If the sensor is connected to the IQ SENSOR NET, the mechanical wiper may start moving unexpectedly. Make sure that the swivel range of the wiper is always free. Only put the sensor down on its leg supports on a flat surface with the ultrasonic transducer pointing downward.*

### 3.3.2 General installation conditions

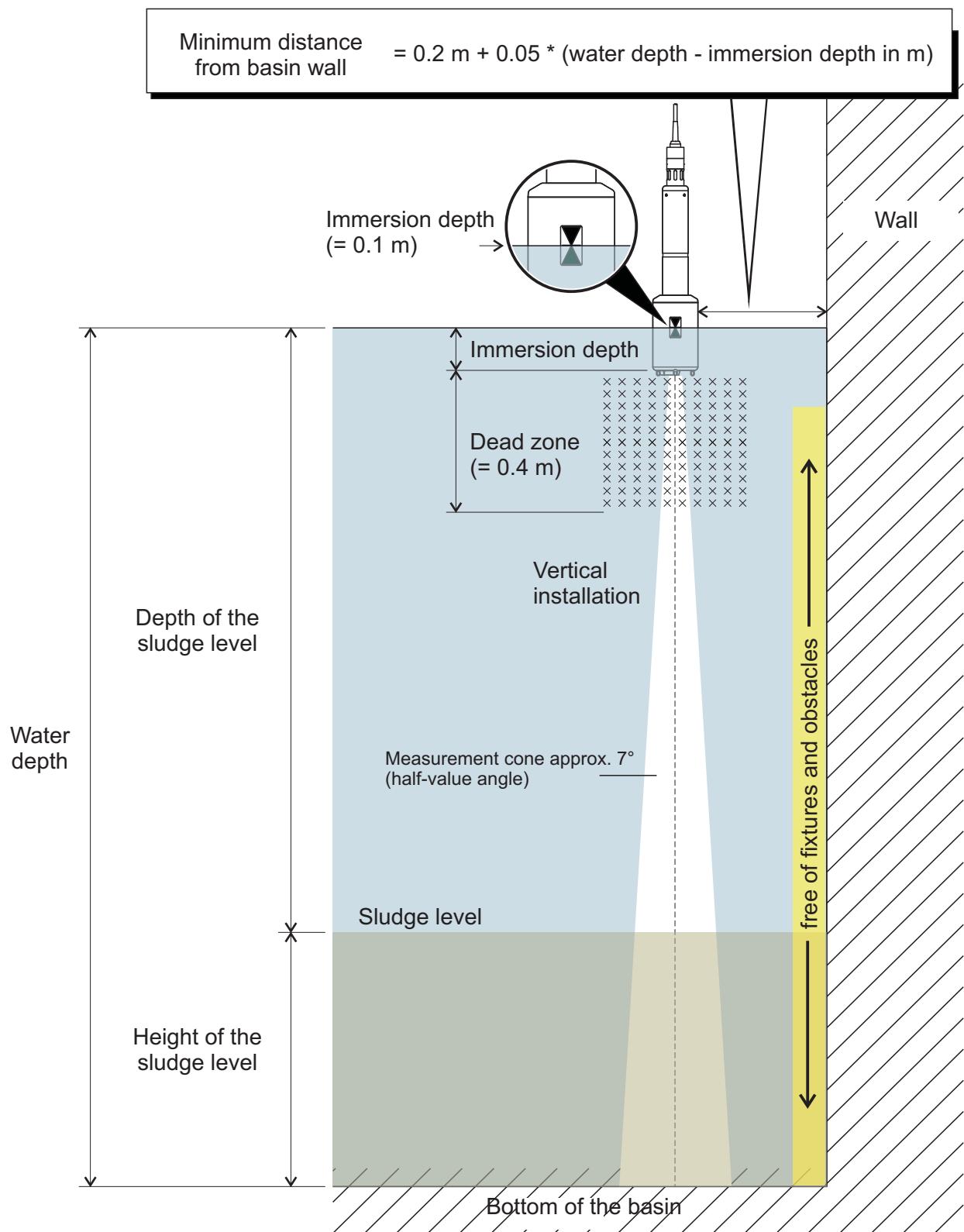


Fig. 3-1 Ideal installation environment

## Sensor installation

The following conditions should always be met:

- Vertical
- Sufficient distance from the basin wall (minimum distance, see formula in Fig. 3-1).  
If the distance to the wall of the basin is small, the wall should be rather smooth.
- Immersion depth (0.05 m ... 3 m)
- Minimum distance between the sensor bottom and sludge blanket = 0.4 m ("dead zone").

Ideally, at the installation location the ultrasonic cone is free of barriers that move the sensor from its position or cross the measuring cone and thus cause interfering echoes.

Additional measures are required in order to minimize negative impacts (see section 3.3.5).

### 3.3.3 Influence of permanently installed fixtures

Permanently installed fixtures in the vicinity of the measuring cone reflect the ultrasonic waves transmitted and thus cause interfering echoes.

If there are permanently installed fixtures in the expectation range of the sludge blanket level, it is not possible to clearly assign an echo to a sludge level. In this case, a different installation location must be selected (e.g. with a greater distance from the wall). Alternatively, the evaluation range can be adjusted.

### 3.3.4 Influence of gas bubbles and suspended particles

Gas bubbles and suspended particles reduce the propagation of ultrasonic waves. A high concentration of gas bubbles and suspended particles can in extreme cases lower the range of the sensor.

If there are range problems, the sensor must be immersed deeper (note the dead zone and maximum depth of immersion).



With the IFL 700 IQ sensor, the mechanical wiper removes gas bubbles and dirt from the surface of the ultrasonic transducer.

### 3.3.5 Short-term interferences due to obstacles

Certain events may for a short period of time affect or interrupt the measurement. In waste water treatment plants, these events are normally:

- Moving scrapers that displace an installed sensor from its measuring position or cross its measuring cone.
- Fixtures permanently installed in the basin such as pipes or scrapers that are touched by the measuring cone of a sensor on a scraper bridge when rotating.

Interferences due to obstacles can be suppressed with the aid of certain settings (see setting table, section 3.5).

The default settings may have to be adjusted as necessary.

A tilting armature is available for installation in basins with a chain scraper or linear scraper for scum removal. Thus the sensor is temporarily pulled out of the basin by the moving scraper.

### 3.3.6 Connecting the sensor

#### Connection cable

A sensor connection cable of the SACIQ or SACIQ SW type is required to connect the sensor. The cable is available in different lengths. Compared to the SACIQ standard model, the SACIQ SW sensor connection cable is optimized concerning its resistance to corrosion. Information on this and other IQ SENSOR NET accessories is given in the YSI catalog and on the Internet.



How to connect the SACIQ (SW) sensor connection cable to the terminal strip of an MIQ module is described in chapter 3 INSTALLATION of the IQ SENSOR NET system operating manual.

#### Are the plug connections dry?

Before connecting the sensor and sensor connection cable, please make sure the plug connections are dry. If moisture gets into the plug connections, first dry the plug connections (dab them dry or blow them dry using compressed air).



Do not suspend the sensor on the sensor connection cable. Use a sensor holder or an armature. Information on this and other IQ SENSOR NET accessories is given in the YSI catalog and on the Internet.

#### Connecting the sensor to the sensor connection cable

1

Take the protective caps off the plug connections of the sensor and the SACIQ (SW) sensor connection cable and keep them safe.

- 2 Plug the socket of the SACIQ (SW) sensor connection cable onto the plug head connector of the sensor. At the same time, rotate the socket so that the pin in the plug head connector (1) clicks into one of the two holes in the socket.
- 3 Then screw the coupling ring (2) of the sensor connection cable onto the sensor up to the stop.

**NOTE (only IFL 700 IQ)**

*If the sensor is connected to the IQ SENSOR NET, the mechanical wiper may start moving unexpectedly. Make sure that the swivel range of the wiper is always free. Only put the sensor down its leg supports on a flat surface with the ultrasonic transducer pointing downward.*

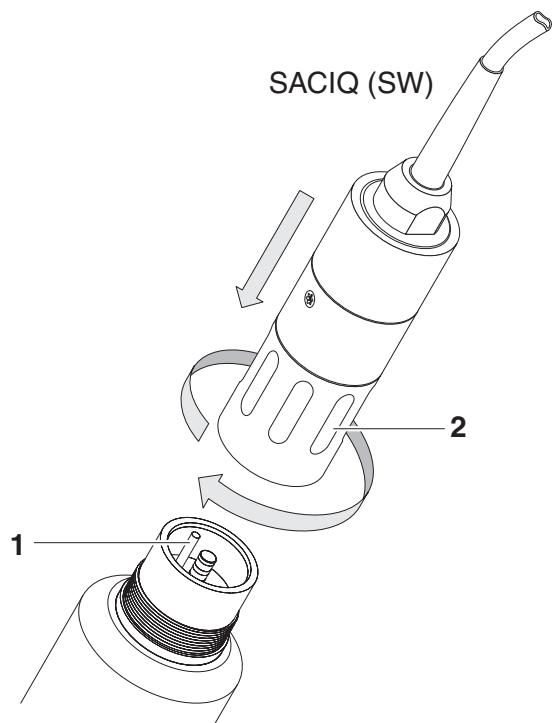


Fig. 3-2 Connecting the sensor

### 3.4 Initial commissioning



Prerequisite for the display of measured values of the IFL 70x IQ on a terminal of the IQ SENSOR NET system is the current software version of the controller and the terminal.

The current software is available on the Internet under [www.YSI.com](http://www.YSI.com).

1	Install the sensor at the measuring location and establish the connection to the IQ SENSOR NET. (see section 3.3).
2	Using <▲▼>, select the IFL 70x IQ sensor in the measured value display.
3	Open the <i>Display/Options / Extended sensor functions</i> menu. The display shows the echo profile and certain special menus.
4	Open the <i>Sensor settings /</i> menu.
5	Adjust the following settings for the measuring location ( <i>Sensor settings</i> ): <ul style="list-style-type: none"><li>● <i>Immersion depth</i></li><li>● <i>Extended settings / Temperature</i> (average water temperature at mean water depth)</li><li>● <i>Water depth</i> (water depth to the bottom of the basin at the measuring location)</li></ul>



#### Setting of *Temperature*

If the average water temperature fluctuates due to seasonal changes we recommend to adjust the mean temperature on the instrument according to the current season.

#### Setting of *Water depth*

The *Water depth* setting should be consistent with reality as much as possible. Therefore, we recommend to determine the water depth at the measuring location and enter it.

6	Using <i>Save and quit</i> , confirm the settings and switch to the display of the echo profile.
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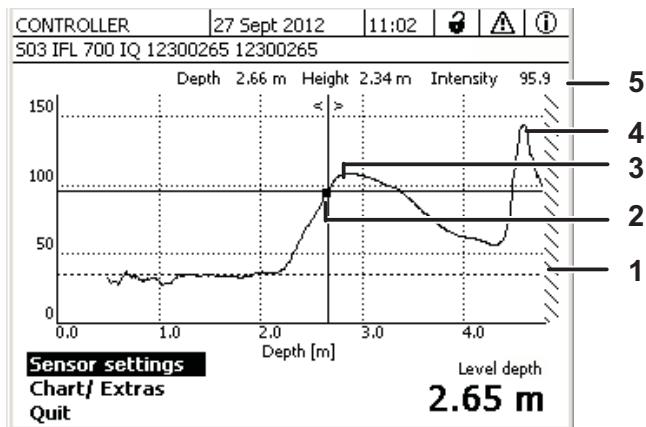


Fig. 3-3 Sample echo profile (sludge blanket height)

1	Entered Water depth (shaded)
2	Move the cursor along the profile (with <◀▶>)
3	<i>Topmost echo:</i> First rise of the sludge concentration viewed from the surface of the water
4	<i>Strongest echo:</i> Most concentrated sludge (greatest intensity)
5	Status line (values at the cursor position)



If the sensor does not provide the expected measured value (e.g. measured value too high, too low or too fluctuating), there are further settings, filters and functions available with which you can optimize the evaluation of the echo profile to meet your requirements (*Sensor settings*, see section 3.5).

6	<p>Use &lt;M&gt; to switch over between the measured value display and echo profile. The echo profile is continued to be represented in the background and can quickly be displayed. or Use <i>Quit</i> to exit the <i>Extended sensor functions</i> menu. The representation of the echo profile is thus terminated. The echo profile can be reactivated with the <i>Display/Options / Extended sensor functions</i> menu.</p>
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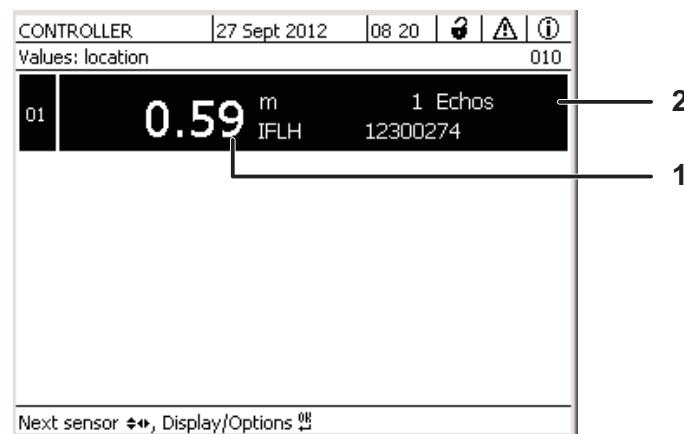


Fig. 3-4 Measured value display with main and secondary measured value

1	Measured value
2	Number of echoes found

### 3.5 Setting table for the IFL 70x IQ

Default values are marked in bold.



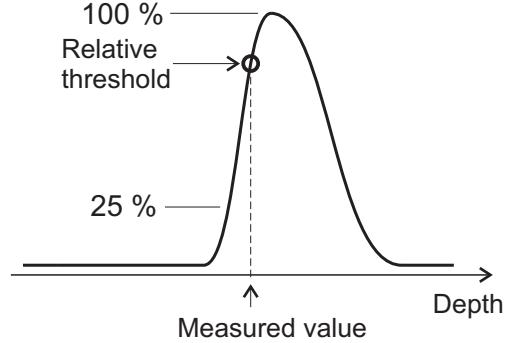
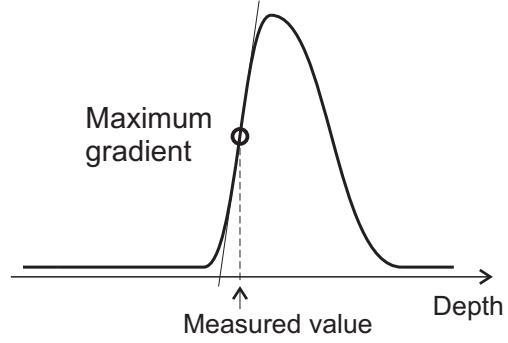
#### 3.5.1 Sensor settings menu

##### Carrying out settings

The sensor settings can be accessed from the following menus:

- Using <S>, switch from the measured value display to the main menu of the settings. Then navigate to the setting menu (setting table) of the sensor. The exact procedure is given in the relevant IQ SENSOR NET system operating manual.
- Using <▲▼>, select the IFL 70x IQ sensor in the measured value display. Using <M>, open the *Display/Options / Extended sensor functions* menu. Open the *Sensor settings* menu.

Setting	Selection/values	Explanation
<i>Measuring mode</i>	<b>Sludge level height</b>	Details see Fig. 3-1 in section 3.3.2
	<b>Sludge level depth</b>	Position of the sludge blanket level in relation to the bottom of the basin (SLH).
<i>Unit</i>	<b>m</b> <b>ft</b>	Position of the sludge blanket level in relation to the surface of the water (SLD).
<i>Immersion depth</i>	<b>0.05 ... 0.10 ... 3.00 m</b>	Selection of the unit for the distance Meter Foot
<i>Water depth</i>	<b>0 ... 6 ... 18 m</b>	Distance between the surface of the ultrasonic transducer (underside of the sensor) and the surface of the water (see Fig. 3-1 in section 3.3.2).

Setting	Selection/values	Explanation
<i>Method</i>	<b>Rel. threshold</b>	<p>The <u>rising</u> side of the echo is evaluated for the measured value determination. One of two methods can be selected for this.</p> <p>The measured value is equivalent to the point where the intensity of the echo reaches the adjusted relative threshold. The value relates to the maximum of the echo intensity (100 %):</p>
	<b>Maximum gradient</b>	 <p>The measured value is equivalent to the point with the maximum gradient:</p> 
<b>Rel. threshold value</b>	25 ... <b>75</b> ... 100 %	Threshold value for evaluation according to the <i>Rel. threshold</i> method.

Setting	Selection/values	Explanation
<i>Echo selection</i>	<b>Topmost echo</b>	With this setting, the echo to be evaluated is determined. The echo is automatically identified according to the criterion that was set.
		The topmost echo (from the surface of the water) is used for calculating the measured value. To ensure that a weak echo can be identified among the surrounding echoes, the interfering echoes can be suppressed with the setting, <i>Minimum intensity</i> .
		The echo with the greatest intensity is output as the measured value. With spongy sludge, the bottom echo is the strongest echo of the echo profile. To avoid taking the bottom echo as the sludge echo, the <i>Water depth</i> and/or <i>Evaluation range</i> setting should be adjusted in such a way that the bottom echo is not taken into account.
<i>Follow echo</i>	<b>On</b> <b>Off</b>	Filter effecting that a new echo is only evaluated if the new echo is in the vicinity of the echo previously determined. The tolerance range moves with each new valid echo.
<i>Minimum intensity</i>	<b>5 ... 30 ... 100</b>	Filter that ignores echoes with low intensity.
<i>Evaluation range</i>	<b>Complete</b>	Filter that ignores measured values outside the selected range.
	<b>Limited</b>	The entire area between the end of the dead zone and the bottom of the basin is displayed.
	<b>Start</b>	
	<b>End</b>	Filter that reduces the measuring range to the limits required. Thus, interfering echoes of any fixtures installed in the basin can be ignored.

Setting	Selection/values	Explanation
<i>Establishing time</i>	0 ... <b>120</b> ... 600 sec	<p>Filter that ignores (interfering) echoes whose residence time within the ultrasonic cone is shorter than the time defined here.</p> <p>Example: To ignore a scraper, the maximum duration of its visibility in the ultrasonic cone has to be entered.</p>
<i>Temperature</i>	0.0 ... <b>15.0</b> ... 50.0	<p>The temperature affects the speed of sound in the measuring medium. This effect can be taken into account by entering the temperature value.</p> <p>Enter the average water temperature at the average water depth of the basin. If there are seasonal fluctuations of the average water temperature we recommend to set a different average temperature for summer and winter.</p>
<i>Save and quit</i>		<p>The sensor stores all changed settings and the display switches to the next higher level.</p>
<i>Quit</i>		<p>The display switches to the next higher level without saving the new settings.</p>

### 3.5.2 *Display/Extras* menu

**Carrying out settings** Using <▲▼>, select the IFL 70x IQ sensor in the measured value display. Using <M>, open the *Display/Options / Extended sensor functions* menu. Open the *Sensor settings* menu.

Setting	Selection/values	Explanation
<i>X-axis (depth)</i>	<b>Complete</b>	The complete height from the ultrasonic transducer to the bottom is displayed.
	<i>Evaluation range</i>	The complete <i>Evaluation range</i> is displayed.
	<i>Zoom range</i> <i>Begin</i> <i>End</i>	The display on the screen is limited to the section set here.
<i>Y-axis (intensity)</i>	<b>Auto</b>	The strongest echo is displayed with the complete intensity.
	<i>Zoom range</i> <i>Begin</i> <i>End</i>	The display on the screen is limited to the section set here.
<i>Displayed profile</i>		This setting only effects the display of the echo profile. The current measured value is still determined with the filter settings.
	<b>Unfiltered</b>	Displays the echo profile without any filters.
	<b>Filtered</b>	Displays the echo profile with all filters.
<i>Apply</i>		Closes the <i>Display/Extras</i> menu.
<i>Scraper test</i>	(only with IFL 700 IQ )	The wiper moves once (function test).



## 4 Measuring

1	Submerge the sensor in the sample.
2	Read the measured value on the terminal of the IQ SENSOR NET system.

### Factors affecting the measured value

The following factors have an impact on the measured value:

- The environmental conditions at the measuring location deviate too much from the sensor settings (*Immersion depth, Water depth, Temperature*)
- The distance between the ultrasonic transducer and the sludge level is too small (dead zone, see also section 3.3.3)
- Moving fixtures cross the measuring cone or the installation location of the sensor
- Foreign bodies or air bubbles are in front of or on the ultrasonic transducer.



## 5 Maintenance, cleaning, accessories

### 5.1 General information



#### WARNING

Contact with the sample can be dangerous for the user!  
Depending on the type of sample, suitable protective measures must be taken (protective clothing, protective goggles, etc.).



We recommend to clean the shaft and ultrasonic transducer surface of the sensor if the sensor has been in the measuring solution without operating for a lengthy period of time.

### 5.2 Cleaning of the sensor shaft and ultrasonic transducer surface

#### NOTE

*Sharp objects can damage the ultrasonic transducer. Please be careful, especially when handling sharp tools, when cleaning and during transport.*

#### NOTE (only IFL 700 IQ)

*If the sensor is connected to the IQ SENSOR NET, the mechanical wiper may start moving unexpectedly. Prior to cleaning the sensor, activate the maintenance condition. Thus the wiper is switched off.*

With normal operation (e.g. municipal wastewater) we recommend cleaning the sensor in the following cases:

- if there is any pollution (according to visual check)
- if the sensor was in the measuring medium but not in operation for a longer period of time
- if you suspect the echo intensity to be too low

Cleaning agents	Contamination	Cleaning agents
	For sludge and loosely adhering dirt, or biological deposits	Soft cloth or soft brush, warm tap water with detergent
	Salt and / or lime deposits	Acetic acid (volume percentage = 20 %), soft cloth or soft sponge



We do not recommend unscrewing the sensor from the sensor connection cable when cleaning the sensor shaft and measuring windows. Otherwise, moisture and/or dirt can get into the plug connection where it can cause contact problems.

If you need to disconnect the sensor from the sensor connection cable, please note the following points:

- Before disconnecting the sensor from the SACIQ (SW) sensor connection cable, remove any larger pieces of contamination from the sensor, particularly in the area of the plug connection (brush it off in a bucket of tap water, wash it off with a hose or wipe it off with a cloth).
- Unscrew the sensor from the SACIQ (SW) sensor connection cable.
- Always place a protective cap on the plug head of the sensor and on the SACIQ (SW) sensor connection cable so that no moisture or dirt can get into the contacting surfaces.
- In corrosive environments, close the socket of the sensor connection cable with the screwable SACIQ-Plug when it is dry in order to protect the electrical contacts from corrosion. The protective plug is available as an accessory (see section 5.3 ACCESSORIES). It is always included in the scope of delivery of the SACIQ SW sensor connection cable .

**Cleaning**

1	Switch on the maintenance condition for the sensor.
2	Pull the sensor out of the sample.
3	Get rid of any coarse impurities on the sensor (brush it off in a bucket of tap water, wash it down with a hose or wash it off with a cloth).

**NOTE**

*Carefully clean the wiper of the IFL 700 IQ from outside.*

4	Clean the sensor shaft and the surface of the ultrasonic transducer as explained in the point CLEANING AGENTS, page 1.
5	Then, rinse it thoroughly with tap water.

**5.3 Accessories**

Information on IQ SENSOR NET accessories is given in the YSI catalog and on the Internet.



## 6 What to do if...

<b>Mechanical damage to the sensor</b>	<b>Cause</b>	<b>Remedy</b>
		<ul style="list-style-type: none"> <li>– Return the sensor</li> </ul>
<b>Display "----" (no valid measured value)</b>	<b>Cause</b>	<b>Remedy</b>
	Sensor is permanently in the air	Immerse the sensor in water (see section 3.3.2)
	There are too many air bubbles in the water or on the ultrasonic transducer	Select a measurement location free of air bubbles
	Sensor is dirty	<ul style="list-style-type: none"> <li>– Clean the sensor and/or its environment</li> <li>– Check the function of the wiper (see section 3.5)</li> </ul>
	Thread algae floating in front of the sensor	Remove the thread algae from the sensor or its environment
	In the selected <i>Evaluation range</i> , no echo is available that meets all settings	<ul style="list-style-type: none"> <li>– Check whether there is a sludge blanket in the selected <i>Evaluation range</i></li> <li>– Check whether the settings are suitable for the application.</li> </ul>
Defective sensor		Contact the service department

The measured value is not within the expected range	Cause	Remedy
	<p>The <i>Water depth</i> is not set correctly (e.g., the bottom echo or multiple echoes between the bottom of the basin and the surface of the water are interpreted as measured value echoes.)</p>	<p>Set the <i>Water depth</i> and <i>Immersion depth</i> correctly</p>
	<p>In the <i>Evaluation range</i> there are permanently installed fixtures that continually generate interfering echoes</p>	<ul style="list-style-type: none"> <li>– Select a measurement location without permanent interfering echoes.</li> <li>– If necessary, limit the <i>Evaluation range</i> so that any permanent interfering echoes are outside the <i>Evaluation range</i>.</li> </ul>
	<p>In the <i>Evaluation range</i> there are moving fixtures (scrapers) that temporarily generate echoes.</p>	<ul style="list-style-type: none"> <li>– Limit the <i>Evaluation range</i> so that the water depth of the scraper is not in the <i>Evaluation range</i>.</li> <li>– Set the <i>Establishing time</i> correctly</li> <li>– Set <i>Follow echo</i> to Yes.</li> </ul>
	<p>The sensor is cyclically moved out of the water by the scraper.</p>	<ul style="list-style-type: none"> <li>– Set the <i>Establishing time</i> correctly</li> <li>– Set <i>Follow echo</i> to Yes.</li> </ul>

Number and position of the echoes changing often	Cause	Remedy
	Small temporary interfering echoes  (e.g. sludge flakes sinking slowly)	<ul style="list-style-type: none"> <li>– Check <i>Echo selection (Top-most echo or Strongest echo)</i></li> <li>– A higher value for the <i>Minimum intensity</i> filter ignores echoes from small, slowly sinking sludge fields.</li> </ul>
	New sludge blankets developing  (e.g. a new sludge blanket developing on top of an old, concentrated sludge blanket).	<ul style="list-style-type: none"> <li>– Check <i>Echo selection (Top-most echo or Strongest echo)</i></li> <li>– <i>Follow echo</i> (change setting to Yes)</li> <li>– Set the <i>Evaluation range</i> to the range expected for the sludge level</li> </ul>
Intensity of the existing echoes changing	Cause	Remedy
	Temporary effect of air bubbles or thread algae	<ul style="list-style-type: none"> <li>– Select a measurement location that has permanently few air bubbles.</li> <li>– Remove any thread algae from the sensor and its environment</li> <li>– Clean the sensor Check the wiper</li> <li>– Check <i>Echo selection (Top-most echo or Strongest echo)</i></li> <li>– <i>Follow echo</i> (change setting to Yes)</li> <li>– Set the <i>Evaluation range</i> to the range expected for the sludge level</li> </ul>
	The sludge blanket level is very high, or the sedimentation behavior is insufficient	Check and adjust the process



## 7 Technical data

### 7.1 Measurement characteristics

<b>Measuring principle</b>	Ultrasound echo measurement			
<b>Measuring ranges and resolution</b>	<b>Measured parameter</b>	<b>Measuring ranges</b>	<b>Resolution</b>	<b>Accuracy</b>

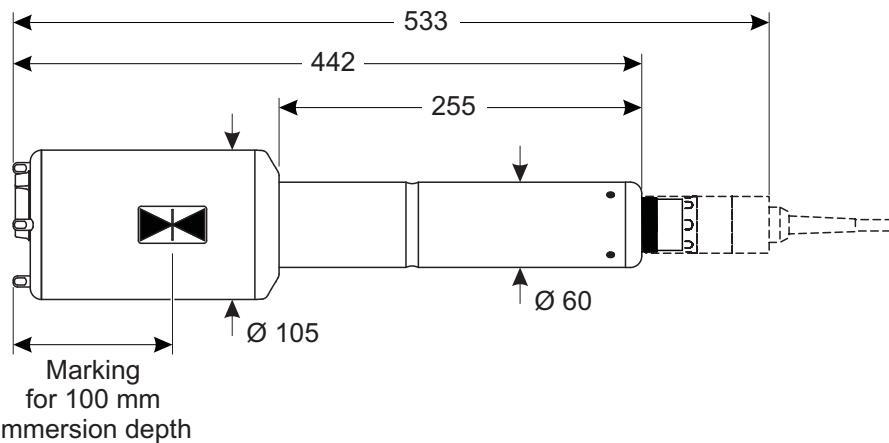
Conversion to sludge level depth (from the surface of the water) or sludge level height (from the bottom of the basin)

### 7.2 Application characteristics

<b>Allowed temperature range</b>	Measuring medium	0 °C ... + 50 °C (32 ... 122°F)
	Storage/transport	- 5 °C ... + 50 °C (23 ... 122 °F)
<b>Allowed pH range of the measuring medium</b>	4 ... 12	
<b>Pressure resistance</b>	Sensor with connected SACIQ (SW) sensor connection cable:  Max. allowed overpressure: $3 \cdot 10^5$ Pa (0.3 bar)	
<b>Type of protection</b>	Sensor with connected SACIQ (SW) sensor connection cable:  IP X8; 0.3 bar ( $3 \cdot 10^5$ Pa)	
<b>Immersion depth</b>	min. 5 cm; max. 3 m	
<b>Flow speed</b>	max. 3 m/s	
<b>Operating position</b>	Vertical with ultrasonic transducer pointing downward	

### 7.3 General data

#### Dimensions (in mm)



#### Weight (without sensor connection cable)

IFL 700 IQ	3.9 kg
IFL 701 IQ	3.7 kg

#### Connection technique

Connection via SACIQ (SW) sensor connection cable

#### Material

Shaft and enclosure	V4A stainless steel 1.4571 POM
Base plate	V4A stainless steel 1.4571
Ultrasonic transducer surface	PVC-C
Wiper (only IFL 700 IQ)	Grivory
Wiper driving shaft (only IFL 700 IQ)	Titan (grade 2)
Plug head connector housing	POM
Plug, 3-pole	ETFE (blue) Tefzel®

#### Cleaning system (only IFL 700 IQ)

Mechanical wiper, maintenance-free

#### Instrument safety

##### Applicable norms

- EN 61010-1
- UL 61010-1
- CAN/CSA C22.2#61010-1

## 7.4 Electrical data

Nominal voltage	Max. 24VDC via the IQ SENSOR NET (for more details, see chapter TECHNICAL DATA of the IQ SENSOR NET system operating manual)
Power consumption	5.5 W (maximum power consumption)  3.0 W (average power consumption) If the sensor is supplied with power by an MIQ/Blue PS mod- ule, only the average power con- sumption has to be taken into account.
Protective class	III



## 8 Indexes

### 8.1 Explanation of the messages

This chapter contains a list of all the message codes and related message texts that can occur in the log book of the IQ SENSOR NET system for the IFL 70x IQ sensor.



Information on the contents and structure of the log book and the structure of the message code is given in the LOG BOOK chapter of the IQ SENSOR NET system operating manual.



The last three digits of the message code form the component code. It identifies the component (active component) that caused the message:

Some error messages contain an internal error code, starting with "#".

Module code	Component
3C1	IFL 700 IQ
3C2	IFL 701 IQ

#### 8.1.1 Error messages

##### Message code

##### Message text

EI13Cx

*Operational voltage too low*

- \* Check installation and cable lengths, Follow installation instructions
- \* Power supply module(s) overloaded, add power supply module(s)
- \* Check terminal and module connections
- \* Defective components, replace components

EI23Cx

*Operational voltage too low, no operation possible*

- \* Check installation and cable lengths, Follow installation instructions
- \* Power supply module(s) overloaded, add power supply module(s)
- \* Check terminal and module connections
- \* Defective components, replace components

ES13Cx

*Component hardware defective*

- \* Contact service

ESA3Cx

*No sludge level can be determined in the selected evaluation range*

- \* Clean and immerse the sensor
- \* Check all settings, especially for immersion depth, water depth, values to be ignored

ESB3Cx

*Erroneous sensor position*

- \* Check the sensor fixations and fix the sensor in a vertical measuring position

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Message code	Message text
ESC3Cx	<i>Sensor defective</i>

### 8.1.2 Info messages

The sensor does not generate any info messages.

## 8.2 Status info

The status info is a coded piece of information on the current status of a sensor. Each sensor sends this status info to the controller. The status info of sensors consists of 32 bits, each of which can have the value 0 or 1.

The bits 0 - 15 are reserved for general information.  
The bits 16 - 21 are reserved for internal service information.

You obtain the status info:

- via a manual query in the *Setup/Serviceinfo>List of all components* menu (see system operating manual)
- by an automated query
  - of a superordinate process control (e. g. when connected to the Profibus)
  - from the IQ Data Server (see IQ SENSOR NET Software Pack operating manual)

The evaluation of the status info, e.g. in the case of an automated query, has to be made individually for each bit.

Status info IFL 70x IQ	Status bit	Explanation
	Bit 0	<i>Component hardware defective</i>
	Bit 1-31	-



## 9 Contact Information

### 9.1 Ordering & Technical Support

Telephone: (800) 897-4151  
(937) 767-7241  
Monday through Friday, 8:00 AM to 5:00 PM ET

Fax: (937) 767-1058

Email: [environmental@ysi.com](mailto:environmental@ysi.com)

Mail: YSI Incorporated  
1725 Brannum Lane  
Yellow Springs, OH 45387  
USA

Internet: [www.ysi.com](http://www.ysi.com)

When placing an order please have the following information available:

YSI account number (if available)	Name and Phone Number
Model number or brief description	Billing and shipping address
Quantity	Purchase Order or Credit Card

### 9.2 Service Information

YSI has authorized service centers throughout the United States and Internationally. For the nearest service center information, please visit [www.ysi.com](http://www.ysi.com) and click 'Support' or contact YSI Technical Support directly at 800-897-4151.

When returning a product for service, include the Product Return form with cleaning certification. The form must be completely filled out for an YSI Service Center to accept the instrument for service. The Product Return form may be downloaded at [www.ysi.com](http://www.ysi.com) and clicking on the 'Support' tab.







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